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(71) Applicant(s)

Whitecroft Lighting Limited  
Burlington Street, ASHTON-UNDER-LYNE,  
Lancashire, OL7 0AX, United Kingdom

(72) Inventor(s)

Paul Cassidy  
Gary Finan

(74) Agent and/or Address for Service

Mewburn Ellis  
York House, 23 Kingway, LONDON, WC2B 6HP,  
United Kingdom

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(56) Documents Cited

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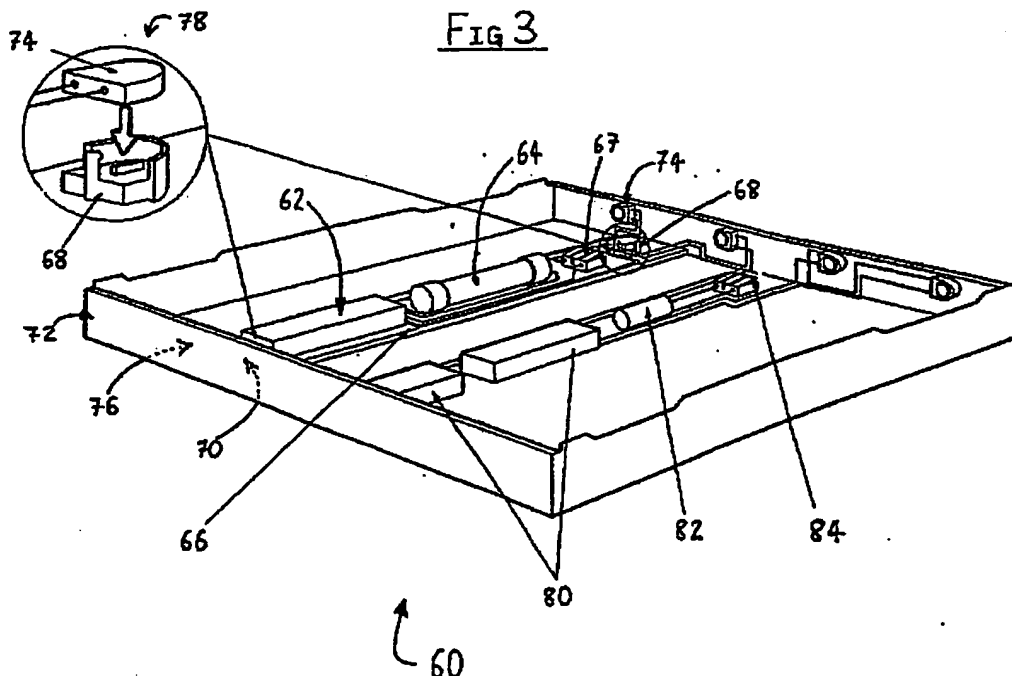
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(54) Abstract Title

Retro-fit emergency lighting

(57) An emergency power supply for a lighting system 60 in the form of a module 66 which can be fitted into existing lamp sockets 74, 76 without the need to provide a replacement fluorescent lamp using two plugs 68 and 70. The tray is provided with a battery 64 and inverter 62 which includes a power failure detector device to detect a drop in mains voltage and supply a reduced power to the lamp from the battery through the inverter and terminal block 67. The system also does not require replacement of the mains starting components such as ballast 80, capacitor 82 and terminal block 84.



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FIG. 1

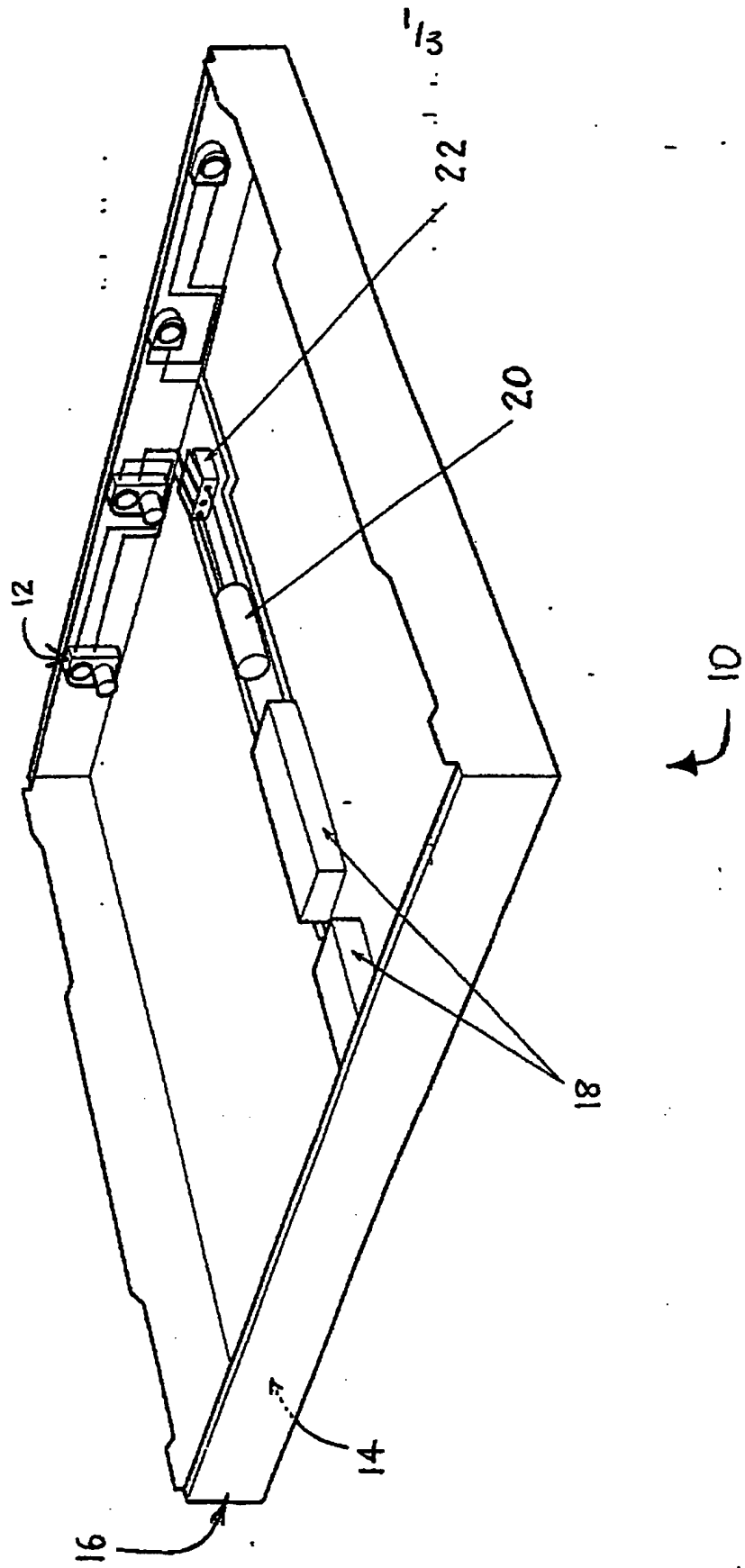


FIG. 2

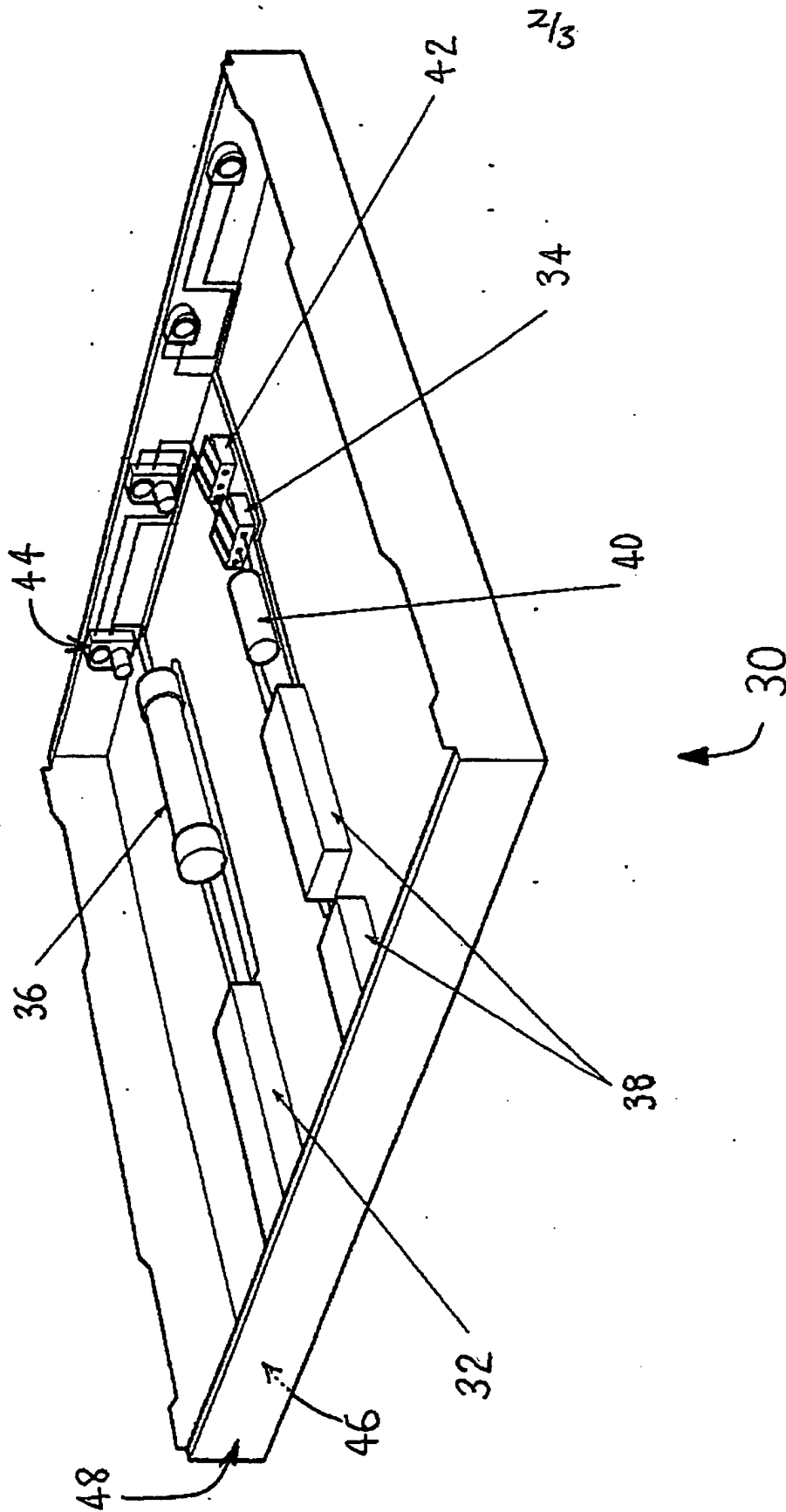
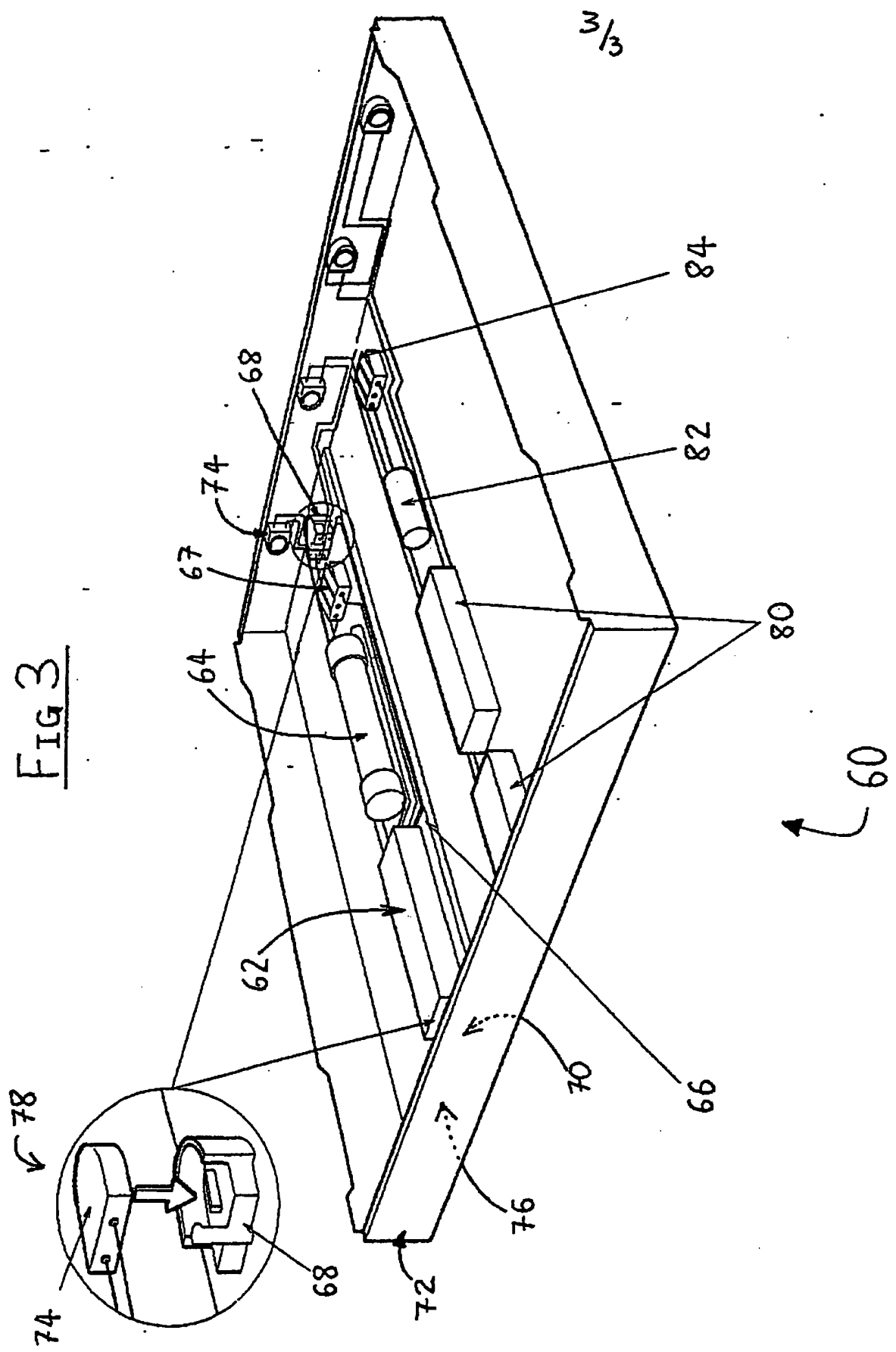


FIG 3



LIGHTING APPARATUS

The present invention relates to a lighting apparatus.

5 More specifically, it relates to a method for converting a lighting apparatus to an emergency lighting apparatus, the emergency lighting apparatus operable, for example, in the event of a mains electricity power failure.

10 In the absence of natural light, a building is normally lit artificially. Most usually, this is achieved using electrical lighting powered by mains electricity. In an emergency, it is desirable that the building has adequate lighting so that the occupants of the building can  
15 evacuate the building as quickly and safely as possible.

During an emergency, for example a fire or a flood in or near the building, the mains electricity may be cut off from all or part of the building. As a result, the  
20 electrical lighting ceases to function in the building. In the absence of natural light within the building, the safe evacuation of the occupants from the building can be inhibited by darkness.

25 In some situations, the mains electrical supply may be interrupted deliberately, for example during routine maintenance. If an emergency situation develops during the time that the mains electrical supply is interrupted, lighting is required to assist the exit of the occupants  
30 from the building.

In order to provide lighting in a building in an emergency situation, an emergency light fitting can be provided. The emergency light fitting can detect an emergency, for  
35 example a failure of the mains electricity supply, and a

battery provides the electrical power to operate the emergency light.

5 Furthermore, a light fitting (or "luminaire") can be provided which operates as a normal light fitting and is powered by mains electricity during normal mains operation. In the event of a failure of the mains electrical supply, a detector within the light fitting can detect the mains failure and a battery provides the  
10 electrical power to operate the light fitting. Typically, in emergency operation, the output of the light fitting is reduced compared to the output during normal, mains powered operation, in order to prolong the time for which the battery can power the light fitting. However, the  
15 output from the light fitting during emergency operation must be great enough to ensure adequate lighting levels for safe evacuation of the building.

20 A known emergency-operable light fitting has provided in it during its manufacture, a mains failure detection device, an "emergency inverter" and a battery. These components are hard-wired in the fitting during its manufacture. However, these components are expensive compared to the other components in the light fitting.  
25 These known light fittings are then used in a lighting system of, for example, a building.

In practice, only a proportion of light fittings within a building need to be operable during an emergency situation  
30 (emergency-operable) in order to provide sufficient emergency lighting for safe evacuation of the occupants. Therefore a building usually contains the cheaper, non-emergency operable light fittings in addition to the more expensive, emergency-operable light fittings. However, it  
35 is desirable that the emergency-operable light fittings

have a similar outward appearance to the non-emergency-operable light fittings. Therefore, in order to satisfy demand, a supplier of light fittings would need to stock emergency-operable versions of each type of light fitting which they supply. In general, suppliers find having to stock emergency operable versions of each type of light fitting highly undesirable.

Alternatively, it is also known to convert a normal, non-emergency light fitting into an emergency-operable light fitting via a conversion process. This conversion process typically involves hard-wiring a battery, an inverter and a mains-failure detection device into the circuitry of the light fitting after the manufacture and assembly of the light fitting.

A example of a standard luminaire is a lighting apparatus according to Fig. 1. Fig. 1 shows a luminaire 10 capable of housing four fluorescent tube lamps. The lamps are powered by mains electricity. Each lamp can be held in place in the luminaire by two sockets for example sockets 12 and 14, one at either end of the lamp. In Fig. 1, socket 14 is hidden by luminaire wall 16. In addition to holding the lamp in place, these sockets provide an electrical connection between the lamp and the mains power supply. The electrical connections on the lamps are shaped so that they fit within the sockets. The lamps are easily removable from the sockets by hand. This facilitates replacing the lamp at the end of its useful life.

The luminaire 10 typically also includes switch start ballast 18, a capacitor 20 and a terminal block 22. Alternatively it may include high frequency control gear. The luminaire 10 of Fig. 1 is not capable of operating in

the event of a mains failure.

Fig. 2 shows a luminaire 30 which is capable of operation in the event of a mains failure. The luminaire 30 is the luminaire 10 shown in Fig. 1 but further includes a mains failure detection device (part of an emergency inverter 32) which has a mains connection from an emergency terminal block 34 which bypasses the power switch controlling the luminaire. The emergency inverter 32 is hard-wired into the lighting circuit. In the event of the detection of a mains failure, the emergency inverter 32 directs power from a battery 36 to one of the lamps, for example, to a lamp placed between sockets 44 and 46 (socket 46 being hidden by wall 48). Usually, this lamp then operates at a reduced output compared to its normal mains operation output. The purpose of this reduced output is to prolong the life of the battery 36 to around 3 hours continuous powering of the lamp. The hard wiring into the lighting circuit of the emergency inverter 32, the battery 36 and the mains connection to the emergency inverter is time-consuming to perform and also time-consuming to reverse, if reversal of the conversion process is required.

The conversion process for converting a light fitting to an emergency-operable light fitting, as outlined above, is time consuming to perform, and requires a skilled electrician to ensure that the resultant light fitting is safe. The hard-wiring procedure typically involves stripping portions of wires and adding terminal blocks to the circuitry in order to include the detection device and the battery. These procedures are time-consuming, require skilled personnel to carry out the procedures and are difficult to perform without changing the outward appearance of the light fitting.



The present invention aims to mitigate some or all of the above problems by providing an improved method for conversion of a light fitting into an emergency-operable light fitting.

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In a first aspect, the present invention provides a method for converting a luminaire to an emergency-operable luminaire, the luminaire including a light source located in a first fitting, the method including the steps of:

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(i) removing the light source from the first fitting;

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(ii) mounting on the luminaire power failure detection means and a second fitting;

(iii) electrically connecting the power failure detection means to the first fitting; and

20

(iv) electrically connecting to the second fitting the same or a different light source;

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wherein, after steps (i)-(iv), the power failure detection means is capable of selectively connecting said same or different light source to a secondary power source in the event of a mains electricity power failure.

30

Typically, step (i) above further includes removing a first electrical contact of said light source from a suitably shaped and dimensioned first socket. Most typically, step (i) further includes removing a second electrical contact of said light source from a suitably shaped and dimensioned second socket, wherein the first and second sockets each form a part of the first fitting.

35

Preferably, the step (ii) of mounting said power failure detection means and second fitting further includes the step of mounting a secondary power source, for example, a battery. Either or both of said power failure detection means and secondary power source may be releasably mountable on said luminaire, for example, using quick-release attachment means.

Most preferably, the power failure detection means and the secondary power source are contained within a module, the module being mounted on said luminaire, preferably using quick-release attachment means.

Preferably, the step of electrically connecting the power failure detection means to the first fitting in step (iii) above is achievable using at least one plug, for example, by electrically connecting the means to the first and second sockets by the first socket reversibly receiving a first plug and a second socket reversibly receiving a second plug.

Advantageously, step (iv) further includes a third socket reversibly receiving a first electrical contact on said same or different light source, wherein the third socket forms a part of the second fitting. Additionally or alternatively, step (iv) further includes a fourth socket reversibly receiving a second electrical contact on said same or different light source, wherein the fourth socket forms a part of the second fitting.

Preferably, step (iv) further includes locating said same or different light source in said first fitting, for example, between the third and fourth sockets so that said same or different light source is substantially in the same position as a corresponding light source would be if

the module was not mounted on the luminaire and the corresponding light source was located in said first fitting, for example, between the first and second sockets. This allows the emergency-operable luminaire to have a similar outward appearance to a non-emergency-operable luminaire.

Also preferably included in step (iii), is the step of dislocating the first fitting from a housing in the luminaire. In preferred embodiments, this involves dislocating each of the first and second sockets from a respective first or second socket housing in the luminaire, without disconnecting either of the first and second socket housings from respective power leads. Typically included in step (iii), is the step of removably locating the second fitting in the position in the housing vacated by the first fitting. In preferred embodiments this will involve removably locating the third socket in the first socket housing and removably locating the fourth socket in the second socket housing.

In a second aspect, the present invention provides an emergency-operable luminaire apparatus, including:

a first fitting;

a light source;

a power failure detection means electrically connectable between the first fitting and the light source; and

a second fitting connectable to the light source;

wherein the power failure detection means and second fitting are mountable on the luminaire, and the power

failure detection means is capable, in use, of selectively connecting the light source to a secondary power source in the event of a mains power failure.

5 Preferably, the first fitting includes a first socket, the first socket being suitably shaped and dimensioned to be capable of releasably receiving an electrical contact of a light source, which may be the same or a different light source.

10 Typically, the light source is of an elongate shape, and electrical contacts of the light source are disposed at opposite ends of the light source.

15 Due to the preferred shape of the said or different source light, the first fitting preferably further includes a second socket.

20 Typically, the power failure detection means is electrically connectable to the first fitting via a plug. In preferred embodiments, the power failure detection means is electrically connectable to the first socket and the second socket via a first plug and a second plug, respectively. Ideally, the first socket is suitably  
25 shaped and dimensioned to releasably receive the first plug and the second socket is suitably shaped and dimensioned to releasably receive the second plug.

30 Preferably, the second fitting further includes a third socket, the third socket suitably shaped and dimensioned to releasably receive a first electrical contact on the light source. Ideally, the second fitting further includes a fourth socket, the fourth socket suitable  
35 shaped and dimensioned to releasably receive a second electrical contact on the light source, the light source

removably locatable between the third and fourth sockets. In this way, the sockets support both ends of the light source as well as providing to the light source an electrical connection to an electrical power supply.

5

When the power failure detection means and second fitting are mounted on the luminaire, the light source is preferably located in the second fitting, for example, between the third and fourth sockets, and the light source is in substantially the same position as a corresponding light source would be if the power failure detection means was not mounted on the luminaire and the corresponding light source was located in the first fitting, for example, between the first and second sockets. This allows the emergency-operable luminaire to have a similar outward appearance to a non-emergency-operable luminaire.

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Typically, the first fitting is held in a housing in the luminaire. The first fitting is desirably dislocatable from the housing and locatable adjacent said power failure detection means. Most preferably, the second fitting is removably locatable in said housing.

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In preferred embodiments, the first and the second sockets are each held in a respective first or second socket housing in the luminaire. The first and second sockets are each desirably dislocatable from their respective socket housing and locatable adjacent said power failure detection means. In especially preferred embodiments, the third and fourth sockets are each removably locatable in a respective one of the first or second socket housings.

35

Preferably, the secondary power supply is located on the luminaire. Most preferably the secondary power supply includes a battery and preferably the power failure

detection means includes or is associated with or is part of an inverter. Advantageously, either or both of said power failure detection means and secondary power source are attachable to the luminaire via a quick-release attachment means.

In preferred embodiments, the power failure detection means and secondary power source are contained in a module.

In a third aspect there is provided a kit for production of an emergency-operable luminaire, the kit including:

a luminaire having a first fitting for housing a light source; and

a module including power failure detection means and a second fitting;

wherein said module is mountable on said luminaire, said power failure detection means being electrically connectable to said first fitting and said same or a different light source being connectable to said second fitting such that, in use, said power failure detection means is capable of selectively connecting said same or different light source to a secondary power source in the event of a mains electricity power failure.

In a fourth aspect, there is provided a module for use in connecting to a luminaire having a first fitting for housing a light source, the module for converting said luminaire to an emergency-operable luminaire, said module including power failure detection means and a second fitting, wherein said module is mountable on said luminaire, said power failure detection means being electrically connectable to said first fitting and said same or different light source being connectable to said second fitting such that, in use, said power failure

detection means is capable of selectively connecting said same or different light source to a secondary power source in the event of a mains electricity power failure.

5 An embodiment of the present invention will now be described in detail, by way of example only, with reference to the accompanying drawings in which:

10 Figure 1 is a schematic view of a standard non-emergency luminaire

Figure 2 is a schematic view of a standard luminaire modified to be an emergency luminaire using the prior art method

15 Figure 3 is a schematic view of a standard luminaire modified to be an emergency luminaire using the present invention.

20 Figures 1 and 2 have been discussed in detail above.

Fig. 3 shows a luminaire 60 which is capable of similar operational functions to the luminaire 30 shown in Fig. 2. It also includes an emergency inverter 62 (including a mains failure detection device) and a battery 64.

25 However, the conversion of the luminaire 10 of Fig. 1 into the luminaire 60 of Fig. 3 is performed by a different, improved method to the conversion of the luminaire 10 of Fig. 1 into the luminaire 30 of Fig. 2.

30 This improved method for conversion may be followed by first taking the luminaire 10 shown in Fig. 1. whereupon a lamp is removed from its sockets. The emergency inverter 62 and the battery 64 are incorporated onto a single

35 emergency conversion gear tray 66. This emergency

conversion gear tray 66 fastens to the luminaire using, for example, quick release fasteners such as clips or half-turn fasteners.

5 Two plugs 68, 70 (plug 70 is hidden from view by luminaire wall 72) are electrically connected to the emergency inverter 62 on the emergency conversion gear tray 66. The electrical contacts on the plugs 68, 70 are shaped and dimensioned similarly to electrical contacts on a lamp to be used in the luminaire 60. Lamp sockets 74, 76 (lamp socket 76 is hidden from view by luminaire wall 72) are then dislocated from their housing within the luminaire, but without disconnecting them from the mains power supply leads (although, for safety reasons, these leads should not be connected to the mains power supply at this time). The dislocated lamp sockets 74, 76 fit, respectively, into plugs 68, 70 as shown in the magnified view 78 and therefore make electrical connection between the emergency inverter 62 and the mains power supply leads.

20 Two further sockets are provided (not shown), electrically connected to the emergency inverter 62 on the emergency conversion gear tray 66. These emergency conversion gear tray sockets are similar in shape to the dislocated lamp sockets 74, 76. The emergency conversion gear tray sockets are each placed in a respective lamp socket housing within the luminaire, these lamp socket housings being those housings recently vacated by lamp sockets 74, 76. The lamp is then located and electrically connected between these two emergency conversion gear tray sockets.

35 In the event of a mains failure to the luminaire converted by this method, the emergency inverter 62 detects the mains failure via an unstitched mains terminal block 67 and isolates one lamp from the mains. It then redirects



power to this lamp from the battery 64 such that the lamp operates at a reduced output compared to its mains power operation output.

- 5 It will be appreciated that this invention may be applied to the conversion of other types, styles and sizes of light fittings and luminaires in order to render them operable in emergency conditions.

CLAIMS

1. A method for converting a luminaire to an emergency-operable luminaire, the luminaire including a light source located in a first fitting, the method including the steps of:

- i) removing the light source from the first fitting;
- ii) mounting on the luminaire power failure detection means and a second fitting;
- iii) electrically connecting the power failure detection means to the first fitting; and
- iv) electrically connecting to the second fitting the same or a different light source;

wherein, after steps i) to iv), the power failure detection means is capable of selectively connecting said same or different light source to a secondary power source in the event of a mains electricity power failure.

2. A method according to claim 1 wherein

said light source includes two electrical contacts and said first fitting includes a first and a second socket, said sockets being locatable in a first position in which said light source is locatable between said sockets and a second position adjacent said power failure detection means; and

said step of removing the light source from the first fitting includes removing said electrical contacts from said sockets in said first position.

3. A method according to claim 1 or claim 2 wherein the step of mounting said power failure detection means and a second fitting on said luminaire further

includes the step of mounting a secondary power source on said luminaire.

4. A method according to claim 3 wherein said power failure detection means and said secondary power source are contained in a module.
5. A method according to claim 4 wherein said module is releasably mountable on said luminaire.
6. A method according to claim 2 wherein the step of electrically connecting the power failure detection means to the first fitting is achievable by electrically connecting the power failure detection means to the first and second sockets by the first socket reversibly receiving a first plug and a second socket reversibly receiving a second plug.
7. A method according to any one of the preceding claims wherein  
said same or different light source includes two electrical contacts and said second fitting includes a third and a fourth socket; and  
the step of electrically connecting the same or different light source to the second fitting includes the third and the fourth socket each reversibly receiving an electrical contact.
8. A method according to claim 2 wherein  
said same or different light source includes two electrical contacts and said second fitting includes a third and a fourth socket; and  
the step of electrically connecting the same or different light source to the second fitting includes the third and the fourth socket each reversibly

receiving an electrical contact;  
the method further including the step of removing  
said first and second sockets from said first  
position to said second position and locating said  
5 third and fourth socket in said first position  
vacated by said first and second socket.

9. A method substantially as any one embodiment herein  
described with reference to the accompanying  
10 drawings.

10. An emergency-operable luminaire apparatus including;  
a first fitting, which in use receives mains  
power;  
15 a light source;  
a power failure detection means being  
electrically connectable to the first fitting; and  
a second fitting connectable to the light  
source;

20 wherein the power failure detection means and second  
fitting are mountable on the luminaire, and the power  
failure detection means is capable, in use, of  
selectively connecting the light source to a  
secondary power source in the event of a mains power  
25 failure.

11. An apparatus according to claim 10 wherein said first  
fitting includes a first and a second socket, said  
sockets being locatable in a first position in which  
30 said or a different light source is locatable between  
said sockets and a second position adjacent said  
power failure detection means.

12. An apparatus according to claim 10 or claim 11  
35 further including a secondary power source being

mountable on said luminaire.

13. An apparatus according to claim 12 wherein said power failure detection means and said secondary power source are contained in a module.

14. An apparatus according to claim 13 wherein said module is releasably mounted on said luminaire.

15. An apparatus according to claim 11 wherein the power failure detection means is electrically connected to the first fitting by connecting the power failure detection means to the first and second sockets using a first plug reversibly located in the first socket and a second plug reversibly located in the second socket.

16. An apparatus according to any one of claims 10 to 15 wherein

said light source includes two electrical contacts and said second fitting includes a third and a fourth socket; and

the light source is electrically connected to the second fitting by the third and the fourth socket each reversibly housing an electrical contact of said light source.

17. An apparatus according to claim 11 wherein

said light source includes two electrical contacts and said second fitting includes a third and a fourth socket; and

the light source is electrically connected to the second fitting by the third and the fourth socket each reversibly housing an electrical contact of said light source; and

in use, the first and second sockets of said first fitting are located in said second position adjacent said power failure detection means and said third and fourth sockets of said second fitting are located in said first position vacated by said first and second sockets.

18. A bit for production of an emergency-operable luminaire, the bit including:

a luminaire having a first fitting for housing a light source; and

a module including power failure detection means and a second fitting;

wherein said module is mountable on said luminaire, said power failure detection means being electrically connectable to said first fitting and said same or a different light source being connectable to said second fitting such that, in use, said power failure detection means is capable of selectively connecting said same or different light source to a secondary power source in the event of a mains electricity power failure.

19. A kit according to claim 18 wherein said module further further includes a secondary power source.

20. A module for a kit according to claim 18 or 19.

21. A module for use in connecting to a luminaire having a first fitting for housing a light source for, the module for converting said luminaire to an emergency-operable luminaire, said module including power failure detection means and a second fitting, wherein said module is mountable on said luminaire, said power failure detection means being electrically

connectable to said first fitting and said same or a different light source being connectable to said second fitting such that, in use, said power failure detection means is capable of selectively connecting said same or different light source to a secondary power source in the event of a mains electricity power failure.

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22. A module according to claim 21 wherein said module further includes a secondary power source.

23. An apparatus, kit or module substantially as any one embodiment herein described with reference to the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB 0022218.2  
Claims searched: 1 to 23

Examiner: Nik Dowell  
Date of search: 13 February 2001

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.S): H2H - HAJ, HLD631

Int CI (Ed.7): H02J - 9/06 ; H05B - 41/285, 41/292

Other: Online : WPI, EPODOC, PAJ

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2 010 606 A (Scientific Prototype manufacturing) see especially figures 5 and 5a	10,12,13, 14,16,18 to 22
X	GB 1 111 297 A (Benning) see especially page 1, lines 8 to 26	10,12,13, 14,16,18 to 22
A	DE 3 636 186 A (Caeg Licht & Strom) see especially WPI abstract accession no. 88-120469/25	-

X Document indicating lack of novelty or inventive step  
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B Patent document published on or after, but with priority date earlier than, the filing date of this application.